

in bronze and faience, broken blue vases with representations of the holy cow emblazoned with stars, &c. These votive offerings, which nearly all date to the eighteenth dynasty, were undoubtedly originally devoted in the Hathor shrine of the great temple, and when the shrine became too full were thrown down by the sacristans into the space between the two temples, which thus became a dust-heap. And from this dust-heap many interesting objects have been recovered, including a copper chisel with hardened edge, which should be of special interest to metallurgists, and specimens of palm-fruit, nuts, reeds, and shells, dating to about 1500 B.C. One of the most remarkable objects found is a perfect three-cornered loaf of unleavened bread, of the same date. All these smaller objects, together with a number of specimens of the eleventh dynasty reliefs already described, will, we understand, be exhibited at the annual exhibition of the Egypt Exploration Fund at University College, Gower Street, in July next.

Subscriptions for the work of the Egypt Exploration Fund are much needed, and should be sent to the Secretary, 37 Great Russell Street, W.C. We are indebted to Mr. Hall for the photographs here published.

### NOTES.

THE achievements of the Japanese in the war are causing increased attention to be given to the influence of brain-power on history. National enlightenment, and the scientific spirit which welcomes every increase of knowledge, are the two chief factors of progress in these days, and the Japanese successes have shown the power of both these attributes. An important article in the *Neue Freie Presse* of Vienna lays emphasis upon the use which Japan has made of its brain-power; and the following extract from a summary published in Monday's *Times* shows how the prediction made by Sir Norman Lockyer in his address to the British Association last year is being fulfilled:—"Japan has adopted modern civilisation with soul and body. She has not merely copied those externals of modernity which rob an uncivilised people of originality without giving any real value in exchange, but she has assimilated eagerly the ideas of modern culture. Modern are her schools, in which the children of all creeds are taught morals, but not religion, in order to avoid all ecclesiastical intolerance. Modern is her view that priests should refrain from political struggles, and should reserve themselves for the leading place in pious exercises. Modern is her wish, despite many a hard rub during the time of transition, to respect without prejudice all free-minded criticism of public affairs and not to crush opposition by brute force, or, worse still, to intimidate it by a system of crafty calumny. Modern also are her sincere respect for freedom of research, her joy in a conception of the universe which makes intelligence, not superstition, the regulating power of human acts, and greets with gladness every new discovery and every new thought; and modern is a policy which incites minds to development instead of fettering them, which favours instead of suppressing the sheer delight in material production."

A CONVERSAZIONE of the Institution of Electrical Engineers will be held at the Natural History Museum on the evening of Tuesday June 28.

THE death is announced of Dr. Max Kaech, officer in charge of the geological collections of the national museum of natural history and ethnography—the Museu Goeldi—at Para, Brazil.

NO. 1807, VOL. 70]

A MEETING of members of council of the South African Association for the Advancement of Science was held at Johannesburg on May 19, Mr. T. Reunert presiding. The chairman reported that he had been in communication with the German, French, Austrian, and Italian Consuls, and was hopeful of the cooperation of these gentlemen in connection with the visit of Continental delegates to South Africa with the British Association next year. Dr. Pakes, referring to the impending departure of Mr. Reunert for England, mentioned that he would represent the South African Association at the forthcoming Cambridge meeting of the British Association.

THE Antarctic ships *Discovery* and *Morning* have sailed from Lyttelton for Plymouth.

THE Institution of Electrical Engineers visited Colchester on Saturday on the occasion of the formal reception and unveiling of an historical picture presented by the institution to the town of Colchester in commemoration of the tercentenary of Dr. William Gilbert, the "father of electrical science," who was born in Colchester.

IN connection with the St. Louis Exposition, an International Electrical Congress has been arranged from September 12 to 17. It will be divided into eight sections, for which the following have been appointed chairmen and secretaries respectively:—A, general theory, Prof. E. L. Nichols, Prof. H. T. Barnes; B, general applications, Prof. C. P. Steinmetz, Prof. Samuel Sheldon; C, electrochemistry, Prof. H. S. Carhart, Mr. Carl Hering; D, electric power transmission, Mr. C. P. Scott, Dr. Louis Bell; E, electric light and distribution, Mr. J. W. Lieb, jun.; Mr. Gano S. Dunn; F, electric transportation, Dr. Louis Duncan, Mr. A. H. Armstrong; G, electric communication, Mr. F. W. Jones, Mr. B. Gherardi; H, electrotherapeutics, Dr. W. J. Morton, Mr. W. J. Jenks. It is at present intended to limit the number of papers to 150, and the transactions are expected to fill three octavo volumes. Mr. Elihu Thomson is president, and Dr. A. E. Kennelly, of Harvard University, general secretary of the congress.

THE annual general meeting of the Ray Society was held on June 9, Lord Avebury, president, being in the chair. The report announced the attainment of the society's sixtieth year; the death of two vice-presidents, Dr. C. H. Gatty, F.R.S., and Mr. R. McLachlan, F.R.S.; the completion of Newstead's "British Coccidæ" and of Michael's "British Tyroglyphidæ." The volumes to be issued during this year and next were stated to be:—Vol. i. of the "British Desmidiaceæ," by Mr. W. West and Prof. G. S. West; vol. i. of the "British Tunicata," by the late Joshua Alder and the late Albany Hancock; vol. i. of the "British Freshwater Rhizopoda and Heliozoa," by James Cash; and vol. ii. of the "Desmidiaceæ." The officers and council elected for the ensuing year were:—President, Lord Avebury, F.R.S.; vice-presidents, Dr. R. Braithwaite, Mr. A. J. Michael, and Lord Walsingham, F.R.S.; treasurer, Dr. DuCane Godman, F.R.S.; and secretary, Mr. John Hopkinson.

THE use that is being made of wireless telegraphy in connection with the war is shown by the following extract from a private letter received from the *Times'* operator at Wei-hai-wei, and published in Wednesday's issue:—"All the British warships, from the third-class cruisers up, are equipped with Marconi, about twenty-four in all; nearly all the Japs have wireless equipment; the Russian ships are equipped, and several German vessels. One or another of them can be heard any time, day or night. The Japs are

particularly numerous, and we are at it all the time. We laugh at them, for we have struck some good points in tuning, which settle them very nicely. On the boat, when receiving our stuff, two of the four wires are grounded directly, which gives best results. Any resistance between those wires and the ground weakens the signals. If we want to hear the Japs call, disconnecting ground wire entirely from syntoniser of the receiver brings them in strong; while with the ground wire on, as in receiving our stuff, the Japs come very faintly. On the shore station it is different. Three wires are best in receiving up to 100 miles, with the other two wires free, at which time the Japs come in weakest. By grounding the other two wires the Japs come in very strong and our stuff weakest. Above 100 miles our stuff comes best with two wires grounded directly. That, of course, allows others to come in, but they are not strong enough to prevent my reading through. So far, that tuning is best, and certainly gives very satisfactory results."

A REUTER message from New York states that Mr. Marconi's effort to supply news daily on board the Cunard liner *Campania* has been entirely successful. The daily news bulletin was issued to the passengers at breakfast. The *Campania* had not long started when news was received from the Seaforth station, and later in the evening from Poldhu. Touch was kept with the latter station until a distance of 2300 miles had been reached on June 9. At 2 a.m. on that date communication was established with Cape Breton, 2000 miles distant, and was maintained until the end of the trip. On June 8 Cape Cod station, 1030 miles distant, was picked up, Cape Breton and Poldhu being also in communication with the ship. On the following day news bulletins were received from the American stations. Communication was begun with Nantucket at 3 p.m. on June 10, news being received from that place as well as from Cape Breton and Cape Cod. In addition to the shore stations, communication was established with the *Etruria* and the *Aurania*. The *Lucania* exchanged news with the *Campania*, and a number of private messages were sent at intervals. Touch with both sides of the Atlantic was continuous for three days in mid-ocean.

We learn from the *Pioneer Mail* that, through the initiative of Mr. E. H. Aitken, a zoological society is about to be founded in Sind with the object of promoting the study of animal life. The society will not aim at making collections of its own, but rather at improving those already existing in the municipal gardens and museum, and turning them to the best account for scientific purposes.

At the suggestion of Prof. W. F. Barrett, Royal College of Science, Dublin, Mr. P. E. Belas described in *NATURE* of May 12 (p. 31) a simple method of showing vortex motion by allowing aqueous fluorescein to flow from a capillary tube with its point just below the surface of water in a tall cylinder, and then tapping the stand supporting the tube. Mr. Robert E. Doran, of Queen's College, Cork, writes to direct our attention to the fact that he has performed a similar experiment in his demonstrations for the past six or seven years. Mr. Doran recommends that a bulb be blown at one end of a glass tube, and that the open end be contracted to slightly less than 1 mm. bore. The bulb and tube are filled completely with a 1 per cent. solution of common salt to which fluorescein has been added to produce a liquid almost free from fluorescence. The tube is clamped vertically over the centre of a tall cylinder filled with water. When the water is at rest the tube is lowered until its aperture just touches the surface. This starts the

experiment, and no tapping is necessary. Several photographs showing the vortex rings resulting from his method of procedure accompany Mr. Doran's letter.

In *La Nature* of May 28, Dr. A. Hamberg, of Stockholm, gives an interesting account of his successful establishment of meteorographs on two mountains in Swedish Lapland. One set of apparatus, that shown in the accompanying illustration, is on the Portitjokko, at an altitude of 1850 metres, and has been working satisfactorily since July, 1902, with the exception of occasional interruptions of the anemometer owing to hoar-frost. The second apparatus is installed on the Sähkrok, at an altitude of about 1080 metres. The barograph and thermograph were constructed by M. Richard, of Paris; the other instruments were made by Dr. Hamberg, with the aid of M. Linderoth, clockmaker, in Sweden. Each set of apparatus weighs 1000 kilograms, and the separate parts had to be conveyed by men and reindeer. The clocks go for a year, each "weight" being 300 kilograms. The recording portions of the meteorograph are encased in screens of sheet iron, inside which pans of calcium chloride are placed. The apparatus on the left of the diagram is the pluviograph. Instead of using ink,



which was found to be unsatisfactory, punctures are made every twenty minutes in the papers covering the drums of the instruments, and occasionally in the autumn the deposit of hoar-frost has to be cleared away by Laplanders. The great difficulties of the problem have only been overcome by Dr. Hamberg after persistent and tedious experiments, both as to position and methods of registration.

We have received from the secretary of the Meteorological Office an excerpt paper containing some of the principal meteorological subjects dealt with in Section A of the British Association meeting at Southport. Among these is a paper on the general circulation of the atmosphere, by Dr. H. H. Hildebrandsson, being a summary of a report to the International Meteorological Committee (Upsala, 1903), which will attract attention. The author points out that while, thanks to the labours of Maury, Brault and others, the system of winds prevailing at the surface of the earth is well known, our knowledge of the motions of the upper currents gained from general publications is mostly based upon theoretical considerations. The late Rev. W. C. Ley commenced observations on the upper clouds in 1872, and in the following year the author established a series of cloud observations in Sweden with the object of determining the movements of the air at different altitudes in areas of high and low barometric pressures. These observations have been supplemented during recent years by experiments with balloons and kites. The result of these investigations, the author states, will render it necessary to abandon once for all the theory hitherto adopted of a



vertical circulation of the atmosphere between the tropics and the poles, and he expresses the hope that the terms "polar" and "equatorial" currents, which have hitherto caused so much confusion in dynamical meteorology, will disappear completely from meteorological science. In his important paper he shows, for instance, that in all parts of the temperate zone of the northern hemisphere an upper current from west to east prevails in all months of the year, while in the tropical zone the currents at all heights are almost without exception from east to west. Another important contribution, by M. L. Teisserenc de Bort, on barometric depressions at various altitudes, is contained in the excerpt above referred to, which corroborates the conclusions arrived at by Dr. Hildebrandsson.

THREE papers on terrestrial magnetism from the reports of the U.S. Coast and Geodetic Survey for 1902 and 1903 have just been received. In a paper on "Magnetic Observatories of the United States Coast and Geodetic Survey," Dr. L. A. Bauer and Mr. J. A. Fleming describe very fully the various points which have to be considered in determining suitable sites for magnetic observatories, and the question whether the elimination of magnetic material in the construction of observatories is essential when used only for observations of variations and not absolute values is discussed. A description of three observatories is given, and the paper is illustrated with maps of the selected sites and with views of the observatories and of the instruments used. A paper on "Magnetic Dip and Intensity Observations (January, 1897, to June 30, 1902)," by Mr. D. L. Hazard, gives full details of the magnetic elements determined at 800 stations—about one-fifth of the total number proposed for the general magnetic survey. In addition to the field observations, the variations of declination and of the horizontal intensity are recorded photographically at four observatories, at each of which the absolute values of the elements are determined at least once a week. Much difficulty was found in obtaining concordant results with different dip circles; subsequently an earth-inductor was selected as a standard dip instrument. In the third paper—"Results of Magnetic Observations made by the Coast and Geodetic Survey between July, 1902, and June, 1903"—Dr. L. A. Bauer describes the method of taking field observations, and gives tables of the results and a full description of each station used for the observations. It is evident that every precaution is taken that each station may be accurately located at any future date.

AMONG our weekly budget of pamphlets, we may refer to a copy of the *Proceedings* of the South London Entomological and Natural History Society for 1903, and also to one of the *Proceedings* of the Philadelphia Academy for April. The latter contains an important paper, by Dr. D. B. Castell, on the cell-lineage and larval development of the nudibranch mollusc *Fiona marina*.

MR. W. E. CLARKE has favoured us with a copy of a paper from the *Proceedings* of the Royal Physical Society of Edinburgh (vol. xv., part ii.) in which he describes, under the name of *Mus musculus faeroensis*, a new form of house-mouse from the Færøes. Large size and certain peculiarities in colour are the distinctive features of this race.

THE medusas of the Bahamas form the subject of the first issue of a new serial (vol. i., No. 1)—the *Memoirs of Natural Sciences*—published by the Brooklyn Institute. Compared with that of the Tortuga Islands, off Florida, the medusa-fauna of the Bahamas has been found by the author—Mr. A. G. Mayer—to be comparatively poor. This is accounted

for by the circumstance that the Tortugas stand in "blue water," whereas the Bahamas are surrounded with shallow flats of coral-mud, very sterile in animal life generally.

An important discovery with regard to the breeding of the cod is recorded by Mr. T. W. Fulton in the *Publications* (No. 8) of the International Council for the Exploration of the Sea. As a rule, cod spawn from January to June—chiefly in March—but some of these fish recently taken on a patch of rocky ground in the North Sea lying to the north-east of Aberdeen, off the coast of Norway, were found to be spawning in September and October. It was already known that the herring has a spring and an autumn spawning season, and now we have proof that, in one area at any rate, the same holds good for the cod. An interesting point for determination is whether there is any difference between the spring and the autumn fry.

DR. C. W. ANDREWS, of the British Museum, has recently returned from Cairo, where he had been studying the fine series of vertebrate remains from the Fayum district. A number of specimens have, we understand, been acquired by exchange for the British Museum, while the series in the museum of the Egyptian Geological Survey at Cairo has been arranged and developed by Mr. Barlow, jun., of the formatori's staff at the Natural History Museum, who went out some months ago for that purpose. Among the more important specimens at Cairo is a young skull of *Arsinoitherium zitteli*, exhibiting the cranial sutures, and thus permitting the identification of the bones from which the huge front horns arise.

FOR nearly twenty years Mr. F. M. Webster, of the Illinois Natural History Laboratory, has been endeavouring to find a means of mitigating the plague of "buffalo-gnats" (*Simulium invenustum*), which of late years have proved so disastrous to cattle-owners in the districts bordering the lower course of the Mississippi. The remedy is a simple, although somewhat expensive one, namely, to prevent the great river from overflowing its banks, for it is in such overflows that these noxious little flies breed, and thus overrun the country. That their ravages are no trifling matter may be gathered from the statement that in 1882 a farmer in Louisiana lost 3200 head of stock from their attacks. Wild animals are terribly tormented by these pests, and a white-tailed deer has actually been known to rush into a blacksmith's forge to obtain relief in the smoke from their bites.

A PAPER ON "Fertility in Sheep," by Mr. F. H. A. Marshall (*Trans. Highland and Agric. Soc., Scotland*), directs the attention of stock breeders to certain points of practical interest which are discussed in a recent memoir by the author on the œstrous cycle in the sheep, published in the *Philosophical Transactions*, and noticed in NATURE of September 3, 1903 (vol. lxxviii. p. 429). The paper concludes with suggestions for future investigations on fertility in the ewe.

MR. THOMAS BURLEIGH has published a second edition of Mr. E. F. Chidell's "Africa and National Regeneration" (pp. 78). The preface to the new issue occupies more than half the pages of the book.

THE list of spectroscopes and spectroscopic accessories just issued by Messrs. Adam Hilger, Ltd., is conveniently arranged, and supplies useful information concerning a great variety of instruments for general work and for special purposes. Among other interesting apparatus described we notice film replicas of Rowland's diffraction gratings with 14,438 lines per inch, and the Michelson echelon diffraction gratings with the number of plates ranging from ten to forty.

A SECOND revised edition of "An Elementary Geography of India, Burma, and Ceylon," by Mr. Henry F. Blanford, F.R.S., has been published by Messrs. Macmillan and Co., Ltd. The important changes which have been made in Indian geography since the appearance of the first edition of the book have caused the author to re-write several portions, and to add new chapters on the North-west Frontier Province and on the Laccadive and Maldivé Islands.

WE have received from the Wentworth Publishing Co., of Surrey Street, W.C., a copy of their new "Seaside and Inland A.B.C. Holiday Guide." The book runs to 311 pages, and contains concise descriptions of all health and pleasure resorts and places of interest in the United Kingdom. Lists of all the golf links throughout the kingdom, of all British spas, of the principal angling stations, and of the coaching centres are also provided. This useful guide costs one shilling net.

ACCORDING to a communication of J. Knett which appears in the *Sitzungsberichte* (No. 11) of the Vienna Academy of Sciences, the thermal springs of Karlsbad deposit small yellow tabular crystals of barium sulphate which are distinctly radio-active, and show all the phenomena characteristic of the presence of an active element.

THE May number of the *Physical Review* contains interesting papers on "Potential Phenomena in Vacuum Tubes during the Production and Interruption of Electrical Discharge," by S. N. Taylor, and "Observations on the Radiation produced in an Alternating Condenser Field," by F. Sanford.

THE investigation of certain complex cerium compounds by Prof. B. Brauner, an account of which appears in the current volume, No. 39, p. 261, of the *Zeitschrift für anorganische Chemie*, throws considerable light on the nature of certain cerium compounds which have been the subject of discussion for several decades. The red coloured salt which separates from the solution obtained by the action of water and sulphuric acid on oxide of cerium is shown to be the acid cerous salt of the complex cerisulphuric acid, and is represented by the formula



Perfectly similar compounds, in which the trivalent cerium is replaced by lanthanum, neodymium and praseodymium, have also been obtained.

SOME interesting facts relating to the influence of the application of potash salts on the agricultural production of Prussia are contained in a recent address by Dr. Carl Ochsenius to the Philadelphia Academy of Sciences. In 1893 the consumption of potash in German agriculture was 60,000 tons, in 1903 it was 150,000 tons. The following numbers give the yields per hectare in kilograms of different kinds of produce for the two years in question:—

	Summer wheat	Summer rye	Summer barley	Oats	Clover and Lucerne	Hay
1893	1477	872	1517	1067	2249	2275
1903	2304	1023	1988	1837	5250	4056

THE existence of a urea-forming enzyme has recently been demonstrated by Kossel and Dakin (*Zeit. physiol. Chem.*, xli., 321, &c.). The enzyme occurs principally in the liver, but is also present in the thymus gland, mucous membrane of small intestine, kidney and lymphatic glands. It possesses the property of causing the rapid decomposition of arginine ( $\delta$ -guanido- $\alpha$ -amidovaleric acid), which is one of the end products of tryptic digestion, into ornithine

( $\alpha\delta$ -diamidovaleric acid) and urea. The enzyme may be roughly isolated by precipitation of extracts of liver with alcohol and ether, or with ammonium sulphate, and may be preserved in the solid form for many months with but little change. The conversion of arginine into urea and ornithine illustrates a new type of enzyme reaction. The enzyme has been named "arginase," and is the first representative of the class of urea-forming enzymes capable of being isolated and of acting outside the body.

### OUR ASTRONOMICAL COLUMN.

COMET 1904 a.—A new set of elements and an ephemeris for this comet are published in No. 3947 of the *Astronomische Nachrichten* by Prof. Strömberg. These vary but slightly from those previously published by Herr Ebert. Observations made on May 19 gave corrections of  $-41s$ . in R.A. and  $+2'2$  in declination to the positions, for that date, derived from Prof. Strömberg's elements, thereby showing the latter to be fairly correct. From this fact it follows that the object which appeared on the Harvard photographs of March 11 and 15, which was thought to be this comet, must have been some other body, for its position is about  $6^\circ$  from the comet's position on that date as deduced from these elements.

The comet's orbit is probably parabolic, and is noteworthy for its large perihelion distance, somewhat similar to that of Giacobini's comet of 1902-3 (the *Observatory*, No. 345).

DURATION OF THE PERSEID SHOWER.—In a letter to the *Observatory* (June), Mr. Denning directs attention to the long duration of the annual shower of Perseids. He states that the shower is certainly active by July 19, and that it has not entirely ceased on August 16; there is some evidence that traces of it have been observed as early as July 7 and as late as August 25, a period of fifty nights.

Mr. Denning also gives a list of radiant for various stages of the shower, derived from the collected observations made during the period 1877-1903 inclusive.

Moonlight will not interfere with the observation of either the earlier stages (July 8-19) or the maximum and latest phases (August 6-19) of this year's shower.

FOUNDATION OF A NEW ASTROPHYSICAL OBSERVATORY.—A letter from Dr. C. Nordmann to the *Revue générale des Sciences* (No. 10, May 30) describes the aims and equipment of a new astrophysical observatory which has just been built near to Tortosa, in Spain, in latitude  $40^\circ 48' N$ . and longitude  $1^\circ 47' E$ . of Paris.

The general idea of the work to be prosecuted is to obtain information regarding the relations between solar and terrestrial phenomena, relations the existence of which has of late years been abundantly confirmed by all workers in solar physics.

Two magnetic houses have been equipped, the one for absolute measures of terrestrial magnetism, the other for obtaining records of the regular variations in the elements and of the extraordinary disturbances which appear to coincide, in point of time, with solar disturbances.

The observatory is also to be furnished with an equatorial for observing sun-spots, an Evershed photo-spectroheliograph, and an instrument for determining the radial velocities of solar prominence eruptions.

Another building has been set apart for meteorological observations and the study of atmospheric optics, and seismological observations have also been provided for.

THE TOTAL SOLAR ECLIPSE OF 1905.—In an article published in the *Popular Science Monthly* for June, Prof. W. W. Campbell gives an interesting *résumé* of what has already been achieved by eclipse expeditions, and indicates the present state of our knowledge regarding eclipse phenomena. He then suggests a number of observations which might be profitably made during the eclipse of May, 1905. Amongst these he considers the search for an intra-mercurial planet to be of prime importance. The observations of Perrine in 1900 seemed to negative the idea of such a planet's existence, but no definite conclusions could be formed owing to the intermittently cloudy state of the